PATCH PANEL ASSEMBLY FOR USE WITH DATA NETWORKS

CROSS-REFERENCES TO RELATED APPLICATIONS

The present invention claims the priority of previously-filed U.S. Provisional Application Nos. 61/103,487 and 61/103,532, both of which were filed on 7 Oct. 2008. The contents of each of these previously-filed applications are incorporated by reference herein in their entireties.

BACKGROUND OF THE INVENTION

The present invention relates generally to infrastructure management systems and, more particularly, to systems, assemblies and components that are useful in managing infrastructure assets.

Computing networks that exist within large organizations consist of two types of devices that must be inter-connected to form a usable data network—these assets are generally classified as end-user devices and networking devices. Examples of end-user devices include personal computers (PC), voice-over-internet protocol (VoIP) phones, and network printers. A typical Local Area Network (LAN) for a large-scale enterprise may include thousands of end-user devices deployed throughout a campus in individual offices or in common areas accessible to the end-users. In addition, data networks also typically include network devices such as switches and routers that form the core of the network. These networking devices serve to route data packets between devices on the LAN, or between the LAN and the larger corporate Wide Area Network (WAN), or to the internet. These network devices are typically located in a centralized room or rooms, known as wiring closets and data centers.

Information technology (IT) departments for such organizations need to know the status of network connectivity of each device, the physical location of the devices, and need to identify the source and location of any errors or problems as quickly as possible. Tracking of device assets is a key concern—for example in monitoring the presence of devices on the network for loss-prevention purposes, or to ensure devices are properly physically positioned in offices or on floors where end users can best utilize them, while maintaining proper connectivity of the network. Currently, a unified system for tracking devices connected to the network and monitoring the status of the physical connectivity of the network does not exist.

The Open System Infrastructure (OSI) model describes layered communications in a computer network. "Layer 1," the physical layer, defines all of the electrical and physical specifications for devices connecting to a network. For example, the Institute of Electrical and Electronics Engineers (IEEE) Standard 802.3 defines the standards for wired Ethernet, which is commonly used in computing networks. As part of the IEEE 802.3 Specification, the physical layer of an Ethernet network is defined. Examples of physical layer elements as defined in IEEE 802.3 include electrical voltages and signal protocols, cable requirements, and termination resistance.

To connect the end-user devices to the network devices requires that the network devices in the wiring closet or data center be connected to end-user devices as needed for the particular requirements of the users of the LAN. Each path from switch to end-user device is known as a channel. The typical deployment of physical layer connectivity for a LAN channel consists of a patch cord between a switch port and a patch panel port; a length of multi-pair cable from the rear of the patch panel port to a work area outlet port at the end-user's office, and a patch cord from the outlet to the end-user's device. Each of these ports are modular jacks designed to industry-standard specifications so as to accept mating patch plugs.

The management of the patch cords in the telecom room or at the work area outlet can present issues to the IT management group. Each time an employee is hired, leaves the organization or changes location, it is inevitable that patch cables must be connected and disconnected. A wiring closet typically contains numerous switches, patch panels and patch cords, numbering at times in the hundreds and higher. The patch cords are often snaked around one another, making the operations of adding, removing, or tracing the patch cords difficult and time-consuming. When a new patch cable has to be connected within the system, or a patch cable has to be moved, a technician enters the wiring closet and must locate the appropriate cable among hundreds, or perhaps thousands, of patch cords. The technician then must locate the appropriate patch panel and the appropriate ports on those patch panels. Finally, the technician must connect the patch cord to the correct ports on the patch panels and verify that the connection has been done correctly. Once the patch cord is connected, there is not an easy, cost and time-effective way to determine if the cord was connected to the correct ports. For example, the technician may have to go to the network port or end-user device located at a remote location, such as an individual's office, to determine if the patch cable was correctly inserted and that network connectivity is available at the asset. Therefore, connecting and transferring networks assets is labor-intensive.

Additionally, the IT department does not have an efficient way to determine the exact location of network problems which may be attributed to the physical layer. For example, the problem may be located in the switch closet if a patch cord was not properly connected, or the problem may exist in the wiring from the switch closet to the network asset. The IT department does not currently have an efficient way to determine if network problems exist in the physical network wiring. Accordingly, a need exists for a better information management system that includes components that simplify the process for identifying assets in order, at a minimum, to reduce the time required to move and check assets on a network.

In order to centralize certain aspects of the data communication network, it becomes desirable to locate the patch panels at one location, such as in the aforementioned switch closet. Space often comes at a premium and it is desirable to have the patch panels located in the closet. However, because switches and other components are also located in the switch closet, as components that are separate from the patch panels, space within the switch closet is at a premium. The patch panels utilize electronic elements apart from their connectors and these elements, such as integrated circuits and the like, are sensitive and susceptible to possible damage during assembly and installation of the patch panels. Additionally, because such patch panels typically utilize jacks for their connectors and these jacks have termination portions that typically utilize insulation displacement technology terminals, the overall patch panels may be subject to impact loads during assembly if the IDT termination tool inadvertently slips out of place. Accordingly, a need exists for a patch panel assembly that concentrates the connection ports and controllers in one location.

The present invention is directed to such a system. We have developed an infrastructure management system that scans